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DATE: Wednesday, August 27, 2003

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DB=USPT; PLUR=YES; OP=AND

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DB=PGPB; PLUR=YES; OP=AND

L2 20020150584

1 L2

END OF SEARCH HISTORY

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dates

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L1: Entry 1 of 3

File: USPT

Jun 3, 2003

US-PAT-NO: 6573093

DOCUMENT-IDENTIFIER: US 6573093 B2

TITLE: Temperature sensitive plasmids of P. haemolytica

DATE-ISSUED: June 3, 2003

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|-------------------|-------|-------|----------|---------|
| Briggs; Robert E. | Boone | IA | | |
| Tatum; Fred M. | Ames | IA | | |

ASSIGNEE-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY | TYPE CODE |
|--|--------|-------|----------|---------|-----------|
| Biotechnology Research and Development Corporation | Peoria | IL | | | 02 |

APPL-NO: 09/ 981897 [PALM]

DATE FILED: October 19, 2001

PARENT-CASE:

This application is a division of co-pending Ser. No. 09/160,340 filed Sep. 25, 1998, now U.S. Pat. No. 6,331,303, which claims the benefit of co-pending provisional application Serial No. 60/060,060, filed Sep. 25, 1997. Both applications are incorporated herein by reference.

INT-CL: [07] C12 N 15/00

US-CL-ISSUED: 435/320.1; 424/255.1, 536/23.7, 435/172.1

US-CL-CURRENT: 435/320.1; 424/255.1, 435/471, 536/23.7

FIELD-OF-SEARCH: 435/320.1, 435/172.1, 424/255.1, 536/23.7

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

Search Selected

Search ALL

| | PAT-NO | ISSUE-DATE | PATENTEE-NAME | US-CL |
|--------------------------|----------------|------------|---------------|-------|
| <input type="checkbox"/> | <u>5422110</u> | June 1995 | Potter et al. | |
| <input type="checkbox"/> | <u>5733780</u> | March 1998 | Briggs et al. | |

FOREIGN PATENT DOCUMENTS

| FOREIGN-PAT-NO | PUBN-DATE | COUNTRY | US-CL |
|----------------|---------------|---------|-------|
| WO 97 16531 | May 1997 | WO | |
| 97/41823 | November 1997 | WO | |

OTHER PUBLICATIONS

George L. Murphy et al., "Hemolytic Activity of the *Pasteurella haemolytica* Leukotoxin" *Infection and Immunity*, vol. 63, Aug. 1995, pp. 3209-3212.

Natalie D. Federova & Sarah K. Highlander "Generation of Targeted Nonpolar Gene Insertions and Operon Fusions in *Pasteurella haemolytica* and Creation of a Strain that Produces and Secretes Inactive Leukotoxin" *Infection and Immunity*, Jul. 1997, pp. 2593-2598.

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Robert E. Briggs et al., "Development and testing of a unique strain of *Pasteurella haemolytica* for use in studies on colonization of the respiratory tract of cattle" *AJVR*, vol. 59, No. 4, Apr. 1998.

Robert E. Briggs et al., "Rapid spread of a unique strain of *Pasteurella haemolytica* serotype 1 among transported calves" *AJVR*, vol. 59, No. 4, Apr. 1998.

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Glynn H. Frank, "Infection of the middle nasal meatus of calves with *Pasteurella haemolytica* serotype 1" *Am J Vet Res*, vol. 50, No. 8, Aug. 1989.

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Homochampa et al., "Cross protective immunity conferred by a marker-free aro A mutant of *Pasteurella multocida*" *Vaccine*, 1997, vol. 15, No. 2.

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Link et al., "Methods for Generating Precise Deletions and Insertions in the Genome of Wild-Type *Escherichia coli*: Application to Open Reading Frame Characterization" *Journal of Bacteriology*, Oct. 1997, vol. 179, No. 20,

pp. 628-6237.

Cotter and Miller "BvgAS-Mediated Signal Transduction: Analysis of Phase-Locked Regulatory Mutants of *Bordetella bronchiseptica* in a Rabbit Model", *Infection and Immunity*, Aug. 1994, vol. 62, No. 8, pp. 3381-3390.

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Petras S.F. et al., "Antigenic and virulence properties of *Pasteurella haemolytica* leukotoxin mutants", *Infection and Immunity*, vol. 63, No. 5, Mar. 1995, pp. 1033-1039.

ART-UNIT: 1645

PRIMARY-EXAMINER: Graser; Jennifer E.

ATTY-AGENT-FIRM: Banner & Witcoff, Ltd.

ABSTRACT:

Mutants of *P. haemolytica* provide excellent safety and efficacy when used as vaccines in ruminants, for example cattle, sheep, and goats, subject to pneumonic pasteurellosis. They can be administered by a variety of routes. Especially preferred is the use in animal feeds. The mutants are not reverting and contain no foreign DNA and no introduced antibiotic resistance genes.

2 Claims, 6 Drawing figures

WEST

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L1: Entry 3 of 3

File: USPT

Dec 18, 2001

US-PAT-NO: 6331303

DOCUMENT-IDENTIFIER: US 6331303 B1

**** See image for Certificate of Correction ****

TITLE: LKTA deletion mutant of P. haemolytica

DATE-ISSUED: December 18, 2001

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|-------------------|-------|-------|----------|---------|
| Briggs; Robert E. | Boone | IA | | |
| Tatum; Fred M. | Ames | IA | | |

ASSIGNEE-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY | TYPE CODE |
|--|--------|-------|----------|---------|-----------|
| Biotechnology Research and Development Corporation | Peoria | IL | | | 02 |

APPL-NO: 09/ 160340 [PALM]

DATE FILED: September 25, 1998

PARENT-CASE:

This application claims the benefit of co-pending provisional application Ser. No. 60/060,060, filed Sep. 25, 1997, which is incorporated by reference herein.

INT-CL: [07] A61 K 39/102

US-CL-ISSUED: 424/255.1, 424/234.1, 435/172.1, 435/252.3, 435/69.1

US-CL-CURRENT: 424/255.1, 424/234.1, 435/252.3, 435/471, 435/69.1

FIELD-OF-SEARCH: 424/234.1, 424/255.1, 536/23.7, 435/320.1, 435/69.1, 435/243, 435/252.3, 435/172.1

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

Search Selected

Search ALL

| | PAT-NO | ISSUE-DATE | PATENTEE-NAME | US-CL |
|--------------------------|----------------|------------|---------------|-------|
| <input type="checkbox"/> | <u>5422110</u> | June 1995 | Potter et al. | |
| <input type="checkbox"/> | <u>5733780</u> | March 1998 | Briggs et al. | |

FOREIGN PATENT DOCUMENTS

| FOREIGN-PAT-NO | PUBN-DATE | COUNTRY | US-CL |
|----------------|---------------|---------|-------|
| WO97 16531 | May 1997 | WO | |
| 97/41823 A | November 1997 | WO | |

OTHER PUBLICATIONS

George L. Murphy et al. "Hemolytic Activity of the *Pasteurella haemolytica* Leukotoxin" *Infection and Immunity*, Aug. 1995, pp. 3209-3212.

Natalie D. Fedorova & Sarah K. Highlander "Generation of Targeted Nonpolar Gene Insertions and Operon Fusions in *Pasteurella haemolytica* and Creation of a Strain that Produces and Secretes Inactive Leukotoxin" *Infection and Immunity*, Jul. 1997, pp. 2593-2598.

Fred M. Tatum et al. "Construction of an isogenic leukotoxin deletion mutant of *Pasteurella haemolytica* serotype 1: characterization and virulence" *Microbial Pathogenesis* 1998; 24:37-46.

Robert E. Briggs et al. "Development and testing of a unique strain of *Pasteurella haemolytica* for use in studies on colonization of the respiratory tract of cattle" *AJVR*, vol. 59, No. 4, Apr. 1998.

Robert E. Briggs et al. "Rapid spread of a unique strain of *Pasteurella haemolytica* serotype 1 among transported calves" *AJVR*, vol. 59, No. 4, Apr. 1998.

Glynn H. Frank et al. "Colonization of the tonsils and nasopharynx of calves by a rifampicin-resistant *Pasteurella haemolytica* and its inhibition by vaccination" *Am J Vet Res.*, vol. 56, No. 7, Jul. 1995.

G.H. Frank et al. "Serotype-specific inhibition of colonization of the tonsils and nasopharynx of calves after *Pasteurella haemolytica* serotype A1 after vaccination with the organism" *Am J Vet Res*, vol. 55, No. 8, Aug. 1994.

G.H. Frank & R.E. Briggs "Colonization of the tonsils of calves with *Pasteurella haemolytica*" *Am J Vet Res*, vol. 53, No. 4, Apr. 1992.

Glynn H. Frank "Infection of the middle nasal meatus of calves with *Pasteurella haemolytica* serotype 1" *Am J Vet Res*, vol. 50, No. 8, Aug. 1989.

David C. Straus et al. "In Vivo Production of Neuraminidase by *Pasteurella haemolytica* in Market Stressed Cattle After Natural Infection" *Current Microbiology*, vol. 37 (1998) pp. 240-244.

Glynn H. Frank et al. "Respiratory tract disease and mucosal colonization by *Pasteurella haemolytica* in transported cattle" *AJVR*, vol. 57, No. 9, Sep. 1996 pp. 1317-1320.

Homchampa et al. "Cross protective immunity conferred by a marker-free aro A mutant of *Pasteurella multocida*" *Vaccine* 1997 vol. 15, No. 2.

Beaumont et al. "Identification and Characterization of alcR, a Gene Encoding an AraC-Like Regulator of Alcaligin Siderophore Biosynthesis and Transport in *Bordetella pertussis* and *Bordetella bronchiseptica*" *Journal of Bacteriology*, Feb. 1998, pp. 862-870, vol. 180, No. 4.

Link et al. "Methods for Generating Precise Deletions and Insertions in the Genome of Wild-Type *Escherichia coli*: Application to Open Reading Frame Characterization" *Journal of Bacteriology*, Oct. 1997, pp. 628-6237, vol. 179, No. 20.

Cotter and Miller "BvgAS-Mediated Signal Transduction: Analysis of Phase-Locked Regulatory Mutants of *Bordetella bronchiseptica* in a Rabbit Model" *Infection and Immunity* Aug. 1994, pp. 3381-3390, vol. 62, No. 8.

Hamilton et al. "New Method for Generating Deletions and Gene Replacements in *Escherichia coli*" *Journal of Bacteriology*, Sep. 1989, pp. 4617-4622, vol. 171, No. 9.

Murphy G.L. et al. "Haemolytic activity of the *Pasteurella haemolytica* leukotoxin" *Infection and Immunity*, vol. 63, No. 8, Aug. 1995, pp. 3209-3212.

Cruz W.T. et al. "Deletion analysis resolves cell-binding and lytic domains of the *Pasteurella* leukotoxin" *Molecular Microbiology*, vol. 4, No. 11, Nov. 1990, pp. 1933-1939.

Petras S.F. et al. "Antigenic and virulence properties of *Pasteurella haemolytica* leukotoxin mutants" *Infection and Immunity*, vol. 63, No. 5, Mar. 1995, pp. 1033-1039.

ART-UNIT: 165

PRIMARY-EXAMINER: Graser; Jennifer E.

ATTY-AGENT-FIRM: Banner & Witcoff

ABSTRACT:

Mutants of *P. haemolytica* provide excellent safety and efficacy when used as vaccines in ruminants, for example cattle, sheep, and goats, subject to pneumonic pasteurellosis. They can be administered by a variety of routes. Especially preferred is the use in animal feeds. The mutants are not reverting and contain no foreign DNA and no introduced antibiotic resistance genes.

3 Claims, 6 Drawing figures

WEST

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L1: Entry 2 of 3

File: USPT

Dec 17, 2002

US-PAT-NO: 6495145

DOCUMENT-IDENTIFIER: US 6495145 B2

TITLE: LktA deletion mutant of P. haemolytica

DATE-ISSUED: December 17, 2002

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|-------------------|-------|-------|----------|---------|
| Briggs; Robert E. | Boone | IA | | |
| Tatum; Fred M. | Ames | IA | | |

ASSIGNEE-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY | TYPE | CODE |
|--|---------------|-------|----------|---------|------|------|
| The United States of America as represented by the Secretary of Agriculture | Washington DC | | | | | 06 |
| Biotechnology Research and Development Corporation | Peoria | IL | | | | 02 |

APPL-NO: 09/ 982232 [PALM]

DATE FILED: October 19, 2001

PARENT-CASE:

This application is a division of co-pending Ser. No. 09/160,340 filed Sep. 25, 1998, now U.S. Pat. No. 6,331,303 which claims the benefit of co-pending provisional application Ser. No. 60/060,060, filed Sep. 25, 1997. Both applications are incorporated herein by reference.

INT-CL: [07] A61 K 39/102

US-CL-ISSUED: 424/255.1, 424/234.1, 424/93.4, 435/69.1, 435/455, 426/2, 426/89

US-CL-CURRENT: 424/255.1, 424/234.1, 424/93.4, 426/2, 426/89, 435/455, 435/69.1

FIELD-OF-SEARCH: 424/255.1, 424/234.1, 424/172.1, 424/252.3, 424/69.1, 424/93.4, 435/69.1, 435/320.1, 435/455, 435/243, 435/252.3, 536/23.7, 426/2, 426/89

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

☐ Search Selected☐ Search ALL

| | PAT-NO | ISSUE-DATE | PATENTEE-NAME | US-CL |
|--------------------------|----------------|------------|---------------|-------|
| <input type="checkbox"/> | <u>5422110</u> | June 1995 | Potter et al. | |
| <input type="checkbox"/> | <u>5733780</u> | March 1998 | Briggs et al. | |

FOREIGN PATENT DOCUMENTS

| FOREIGN-PAT-NO | PUBN-DATE | COUNTRY | US-CL |
|----------------|---------------|---------|-------|
| WO 97 16531 | May 1997 | WO | |
| WO 97/41823 | November 1997 | WO | |

OTHER PUBLICATIONS

George L. Murphy et al., "Hemolytic Activity of the Pasteurella haemolytica Leukotoxin" Infection and Immunity, vol. 63, Aug. 1995, pp. 3209-3212.

Natalie D. Federova & Sarah K. Highlander "Generation of Targeted Nonpolar Gene Insertions and Operon Fusions in Pasteurella haemolytica and Creation of a Strain that Produces and Secretes Inactive Leukotoxin" Infection and Immunity, Jul. 1997, pp. 2593-2598.

Fred M. Tatum et al. "Construction of an isogenic leukotoxin deletion mutation of Pasteurella haemolytica serotype 1: characterization and virulence" Microbial Pathogenesis 1998; 24:37-46.

Robert E. Briggs et al., "Development and testing of a unique strain of Pasteurella haemolytica for use in studies on colonization of the respiratory tract of cattle" AJVR, vol. 59, No. 4, Apr. 1998.

Robert E. Briggs et al., "Rapid spread of a unique strain of Pasteurella haemolytica serotype 1 among transported calves" AJVR, vol. 59, No. 4, Apr. 1998.

Glynn H. Frank et al., "Colonization of the tonsils and nasopharynx of calves by a rifampicin-resistant Pasteurella haemolytica and its inhibition by vaccination" Am J Vet Res., vol. 56, No. 7, Jul. 1995.

G.H. Frank et al., "Serotype-specific inhibition of colonization of the tonsils and nasopharynx of calves after Pasteurella haemolytica serotype A1 after vaccination with the organism" Am J Vet Res, vol. 55, No. 8, Aug. 1994.

G.H. Frank & R.E. Briggs, "Colonization of the tonsils of calves with Pasteurella haemolytica serotype 1", Am J Vet Res, vol. 53, No. 4, Apr. 1992.

Glynn H. Frank, "Infection of the middle nasal meatus of calves with Pasteurella haemolytica serotype 1" Am J Vet Res, vol. 50, No. 8, Aug. 1989.

David C. Straus et al., "In Vivo Production of Neuraminidase by Pasteurella haemolytica in Market Stressed Cattle After Natural Infection", Current Microbiology, vol. 37 (1998), pp. I 240-244.

Glynn H. Frank et al, "Respiratory tract disease and mucosal colonization by Pasteurella haemolytica in transported cattle", AJVR, vol. 57, No. 9, Sep. 1996, pp. 1317-1320.

Homchampa et al., "Cross protective immunity conferred by a marker-free aro A mutant of Pasteurella multocida" Vaccine, 1997, vol. 15, No. 2.

Beaumont et al., Identification and Characterization of *alcR*, a Gene Encoding an AraC-Like Regulator of *Alcaligin* Bacteriology, Feb. 1988, vol. 180, No. 4, pp. 862-870.

Link et al., "Methods for Generating Precise Deletions and Insertions in the Genome of Wild-Type *Escherichia coli*: Application to Open Reading Frame Characterization" *Journal of Bacteriology*, Oct. 1997, vol. 179, No. 20, pp. 628-6237.

Cotter and Miller "BvgAS-Mediated Signal Transduction: Analysis of Phase-Locked Regulatory Mutants of *Bordetella bronchiseptica* in a Rabbit Model", *Infection and Immunity*, Aug. 1994, vol. 62, No. 8, pp. 3381-3390.

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Cruz W.T., et al., "Deletion analysis resolves cell-binding and lytic domains of the *Pasteurella luktoxin*" *Molecular Microbiology*, vol. 4, No. 11, Nov. 1990, pp. 1933-1939.

Petras S.F. et al., "Antigenic and virulence properties of *Pasteurella haemolytica* leukotoxin mutants", *Infection and Immunity*, vol. 63, No. 5, Mar. 1995, pp. 1033-1039.

ART-UNIT: 1645

PRIMARY-EXAMINER: Wortman; Donna C.

ASSISTANT-EXAMINER: Zeman; Robert A.

ATTY-AGENT-FIRM: Banner & Witcoff, Ltd.

ABSTRACT:

Mutants of *P. haemolytica* provide excellent safety and efficacy when used as vaccines in ruminants, for example cattle, sheep, and goats, subject to pneumonic pasteurellosis. They can be administered by a variety of routes. Especially preferred is the use in animal feeds. The mutants are not reverting and contain no foreign DNA and no introduced antibiotic resistance genes.

9 Claims, 6 Drawing figures

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L1: Entry 1 of 3

File: USPT

Jun 3, 2003

US-PAT-NO: 6573093

DOCUMENT-IDENTIFIER: US 6573093 B2

TITLE: Temperature sensitive plasmids of *P. haemolytica*

DATE-ISSUED: June 3, 2003

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|-------------------|-------|-------|----------|---------|
| Briggs; Robert E. | Boone | IA | | |
| Tatum; Fred M. | Ames | IA | | |

ASSIGNEE-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY | TYPE CODE |
|--|--------|-------|----------|---------|-----------|
| Biotechnology Research and Development Corporation | Peoria | IL | | | 02 |

APPL-NO: 09/ 981897 [PALM]

DATE FILED: October 19, 2001

PARENT-CASE:

This application is a division of co-pending Ser. No. 09/160,340 filed Sep. 25, 1998, now U.S. Pat. No. 6,331,303, which claims the benefit of co-pending provisional application Serial No. 60/060,060, filed Sep. 25, 1997. Both applications are incorporated herein by reference.

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FIELD-OF-SEARCH: 435/320.1, 435/172.1, 424/255.1, 536/23.7

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

Search Selected

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|--------------------------|----------------|------------|---------------|-------|
| <input type="checkbox"/> | <u>5422110</u> | June 1995 | Potter et al. | |
| <input type="checkbox"/> | <u>5733780</u> | March 1998 | Briggs et al. | |

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|----------------|---------------|---------|-------|
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| 97/41823 | November 1997 | WO | |

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Link et al., "Methods for Generating Precise Deletions and Insertions in the Genome of Wild-Type *Escherichia coli*: Application to Open Reading Frame Characterization" *Journal of Bacteriology*, Oct. 1997, vol. 179, No. 20,

pp. 628-6237.

Cotter and Miller "BvgAS-Mediated Signal Transduction: Analysis of Phase-Locked Regulatory Mutants of *Bordetella bronchiseptica* in a Rabbit Model", *Infection and Immunity*, Aug. 1994, vol. 62, No. 8, pp. 3381-3390.

Hamilton et al., "New Method for Generating Deletions and Gene Replacements in *Escherichia coli*", *Journal of Bacteriology*, Sep. 1989, vol. 171, No. 9, pp. 4617-4622.

Cruz W.T., et al., "Deletion analysis resolves cell-binding and Lytic domains of the *Pasteurella luktoxin*" *Molecular Microbiology*, vol. 4, No. 11, Nov. 1990, pp. 1933-1939.

Petras S.F. et al., "Antigenic and virulence properties of *Pasteurella haemolytica* leukotoxin mutants", *Infection and Immunity*, vol. 63, No. 5, Mar. 1995, pp. 1033-1039.

ART-UNIT: 1645

PRIMARY-EXAMINER: Graser; Jennifer E.

ATTY-AGENT-FIRM: Banner & Witcoff, Ltd.

ABSTRACT:

Mutants of *P. haemolytica* provide excellent safety and efficacy when used as vaccines in ruminants, for example cattle, sheep, and goats, subject to pneumonic pasteurellosis. They can be administered by a variety of routes. Especially preferred is the use in animal feeds. The mutants are not reverting and contain no foreign DNA and no introduced antibiotic resistance genes.

2 Claims, 6 Drawing figures

WEST**End of Result Set**

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L2: Entry 1 of 1

File: PGPB

Oct 17, 2002

PGPUB-DOCUMENT-NUMBER: 20020150584

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020150584 A1

TITLE: LktA deletion mutant of P. haemolytica

PUBLICATION-DATE: October 17, 2002

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|-------------------|-------|-------|---------|---------|
| Briggs, Robert E. | Boone | IA | US | |
| Tatum, Fred M. | Ames | IA | US | |

ASSIGNEE-INFORMATION:

| NAME | CITY | STATE | COUNTRY | TYPE CODE |
|--|--------|-------|---------|-----------|
| Biotechnology Research and Development Corporation | Peoria | IL | US | 02 |

APPL-NO: 10/ 055174 [PALM]

DATE FILED: January 25, 2002

RELATED-US-APPL-DATA:

Application 10/055174 is a division-of US application 09/245331, filed February 5, 1999, PENDING

Application 09/245331 is a continuation-in-part-of US application 09/160340, filed September 25, 1998, US Patent No. 6331303

Application is a non-provisional-of-provisional application 60/060060, filed September 25, 1997,

INT-CL: [07] A61 K 39/00, A61 K 39/38

US-CL-PUBLISHED: 424/184.1

US-CL-CURRENT: 424/184.1

REPRESENTATIVE-FIGURES: NONE

ABSTRACT:

Mutants of *P. haemolytica* provide excellent safety and efficacy when used as vaccines in ruminants, for example cattle, sheep, and goats, subject to pneumonic pasteurellosis. They can be administered by a variety of routes. Especially preferred is the use in animal feeds. The mutants are not reverting and contain no foreign DNA and no introduced antibiotic resistance genes.

[0001] This application claims the benefit of co-pending provisional application Serial No. 60/060,060, filed Sep. 25, 1997, which is incorporated by reference herein.